

A PECULIAR NEW CARNIVORE FROM THE CUYAMA MIOCENE, CALIFORNIA

By CHESTER STOCK

INTRODUCTION.—In 1938 a few additional remains of fossil mammals were collected in the land-laid Cuyama beds of Apache Canyon, Ventura County, California, by Robert M. Leard of the California Institute of Technology. Among these was a fragmentary portion of a small carnivore skull, identified as belonging to a canid and representing a new genus. Since the relationships of the type were not definitely established, and remained uncertain, it was the intention of the writer to place the description on record in the hope that later investigation might yield additional facts. The war intervened, however, and rather than delay longer, the description is now published, especially since it may be found desirable to refer to the specimen in neogene faunal studies at present in progress.

I have benefited from a discussion of the peculiar characters of the Cuyama specimen with Dr. R. A. Stirton.

Geologic location.—The fossil material occurred at C. I. T. Vert. Paleo. Loc. 64, in Section 2, T. 8 N., R. 23 W., Mt. Pinos quadrangle. Recently, Thomas W. Dibblee Jr., geologist for the Richfield Oil Corporation, informed me¹ that the location places the specimen in what he has designated the "Caliente" formation. This he regards of probable middle Miocene age (Mohnian or Luisian stage according to the foraminiferal sequence in the Miocene of California). There is, however, the possibility that it belongs in the upper Miocene (Delmontian stage).

Mr. Dibblee, who has mapped the area for the Richfield Oil Corporation, states: "The section exposed in Apache Canyon is continental, in which I have differentiated three formations as follows, with tentative names:

"Morales" Formation, Pliocene, gray sand, conglomerate and clays.

"Apache" Formation, upper Miocene, buff-red sand, pebbly sand and gypsiferous red clays. (Equivalent to Santa Margarita formation to west).

"Caliente" Formation,² middle Miocene, coarse gray conglomerate, gray sands and red clays. (Equivalent to Monterey formation to west and probably to type Mint Canyon formation)."

¹Letters under date of January 17 and 29, 1947.

²Not to be confused with, but possibly the correlative of, the strata whence has come the Caliente fauna described by Dougherty (Carnegie Inst. Wash. Publ. No. 514, pp. 109-143, 4 figs., 7 pls., 1940).

As indicated below, the fauna suggests an age for the deposits not so old as middle Miocene.

Cuyama Vertebrate Fauna.—Previous collecting in the area by Gazin³ and by Wood⁴ yielded a fauna which is listed as follows:

Testudinate remains
Avian remains
Canid ? sp.
Citellus (Protospermophilus) quatalensis Gazin
Perognathoides cuyamensis Wood
Perognathus furlongi Gazin
Hypolagus apachensis Gazin
Palaeolagine, gen. and sp. indet.
Mastodont sp.
Merychippus sumani Merriam
Protohippus sp.
Hipparion? sp.
? cf. Plesippus⁵
Camelid sp.
Merycodus sp.

The age relationships of the fauna suggest a Mio-Pliocene stage in the sequence of western Tertiary faunas. Whether the assemblage is early Clarendonian or late Barstovian may be debated. The composition of the fauna, with the exception of one or two forms, leaves the impression that a very late Miocene stage is represented. Gazin commented on the almost total absence of remains of carnivores in the Cuyama fauna. In the face of this fact the present material has added interest, although lack of certain information regarding its relationships curtails at present any direct inferences which may be drawn as to its geologic age. It is described as a new genus and species as follows:

**ACTIOCYON LEARDI*, n. gen. and n. sp.

Type specimen.—Portions of snout and palate with teeth, No. 2747 C.I.T. Vert. Paleo., Plate 19, figures 1, 1a.

Generic and specific characters.—Skull small, approximating that of *Cynodesmus thomsoni* in size. Dentition 3, 1, 1, 2. Upper carnassial short and wide with no anterointernal cusp, its place being taken by a very well developed cingulum that continues along the inner side of the tooth as a shelf with bordering crenulate edge but is more moderately developed from about the middle of the crown to the rear of the tooth. M₁ is subtriangular in shape with hypocone crescent short, protocone a low anteroposteriorly

³Gazin, C. L., Carnegie Inst. Wash. Publ. No. 404, art. 6, pp. 55-76, 5 figs., 4 pls., 1930.

⁴This identification is based on a large calcaneum found by Dr. Wood. It is difficult to reconcile the presence of Plesippus with the Cuyama fauna as now known. The possibility that the specimen represents a large hypohippine form might be further explored.

⁵Aktlos, pertaining to the coast; κύων, dog; the species is named for Robert M. Leard, who collected the specimen.

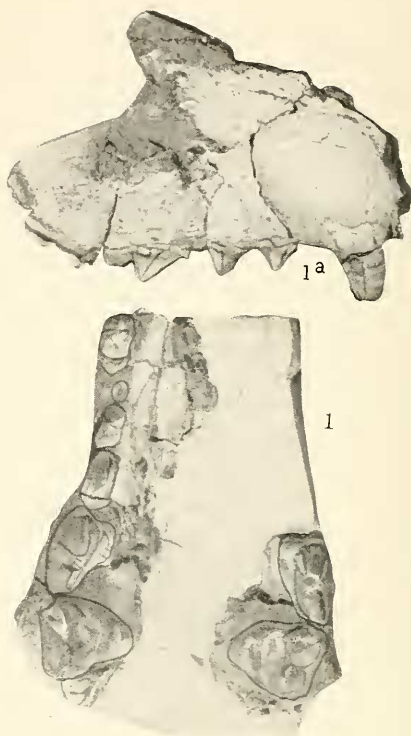


PLATE 19

Figs. 1, 1a. *Actiocyon leardi* n. gen. and n. sp. Skull, No. 2747 Calif. Inst. Tech. Vert. Paleo. Coll.; fig. 1, palate and occlusal view of teeth; fig. 1a, lateral view; nat. size. Cuyama Miocene, California.

extended crest, metaconule very small, paracone and metacone connate, external cingulum present. The imperfectly preserved M_2^1 is small, crown evidently reduced in size with metacone only a tiny cusp in comparison to the paracone.

Canine with root relatively large for size of crown. External face of crown with well marked longitudinal groove. P_1 is single-rooted with crown not preserved. P_2^1 is small, two-rooted, with simple crown having no accessory cusps. P_3^1 , noticeably larger than P_2^1 , likewise with simple crown and with extended posterior base.

Description.—When specimen 2747 was collected in the field there was definite evidence of the presence of three incisor teeth on the right side of the snout. These teeth were small, poorly pre-

served, and were evidently lost before the specimen was prepared in the laboratory. For the size of its crown, the upper canine has a heavy, almost bulbous root. The crown of the canine is convex externally with the internal face flattened. In *Potos* and in *Nasua* the canine shows greater transverse flattening of the crown. A well marked longitudinal groove occurs on the outer face similar to the grooves seen in the canine of *Potos*.

Crown of P_1 is not preserved, but the anteroposterior length of the cross-section of root is 2.7 mm. In both P_2 and P_3 the tip of the cusp is blunt, not sharp, and lies in the fore half of the crown. There is no posterior accessory cusp. A cingulum occurs along the lingual side of the crown in these teeth, and is more in evidence in P_3 than in P_2 . A faint external cingulum occurs in P_2 and P_3 .

Actiocyon is characterized especially by the small thick carnassial for the latter is wide for its length. The tooth possesses at the anterointernal corner in place of the protocone a well developed shelf or cingulum. This shelf reaches backward to a point below the notch between paracone and metacone where it continues as a well marked cingulum to the posterior end of the crown. There is no tendency to project the anterointernal corner in front of the anterior level of the crown as in *Cynodesmus* or *Cynodictis*. However, the anterointernal edge of the shelf thickens, and a similar thickening, but extending for a slightly longer distance, is seen immediately behind. This latter thickened edge is divided by a notch into two parts. The blade-like metacone is short. The tooth reminds one of the procyonids, but the two inner cusps present in *Phlaocyon* and *Procyon* are unlike the thickening of the edge of the inner shelf noted above in the Cuyama specimen.

In M_1 the outer cusps have a full connate development with metacone visibly smaller than paracone. While an external cingulum is present, the summits of the outer cusps are not removed to so great a distance from the outer edge of the crown as in earlier dogs. The protocone is a wide crescent-shaped cusp, the protoconule barely discernible, and the metaconule is relatively small. The hypocone is narrow transversely. The narrowness of the inner side of M_1 gives this tooth a subtriangular configuration. Unfortunately, M_2 is only partly preserved. Enough of the crown remains to show that the tooth was reduced in size with the metacone a tiny cusp. It is evident that this tooth was wider in an anteroposterior direction across its mid-section than across the outer side. When the skull fragment is viewed from the side (Plate 19, figure 1a) the tooth is seen to have a position above the level of the tooth row. This may be in part due to the state of preservation of the specimen.

The fragments of lower jaw in the Cuyama collection, referred questionably to a canid by Gazin, include a specimen (No. 65

C.I.T.) in which P^1 is preserved. This tooth is narrower than P^2 in *Actiocyon*. Moreover, what is left of M^1 and the alveolus for this tooth give evidence of a narrower, more slender, lower first molar than that which would be expected if No. 65 belonged to *Actiocyon*.

MEASUREMENTS (IN MILLIMETERS) OF No. 2747

Anterior end of C to posterior end M_2	51.4
C, anteroposterior diameter	6.8
C, transverse diameter	4.6
P_2 , anteroposterior diameter	5.8
P_2 , transverse diameter	2.9
P_3 , anteroposterior diameter	7.6
P_3 , transverse diameter	4
P_4 , anteroposterior diameter	11.6
P_4 , transverse diameter	8
M_1 , anteroposterior diameter along outer side...	11.1
M_1 , transverse diameter normal to outer side....	11.9

Comparisons.—*Actiocyon* appears to resemble most closely in its curious characters the European canid *Alopecocyon*.⁶ This genus was originally described under the generic name *Alopecodus* (preoccupied) by Viret,⁷ the genotype being *Cephalogale gaillardi* Wegner. The latter species and associated fauna were first described by Wegner⁸ from upper Miocene deposits near Oppeln in Upper Silesia. The species occurs likewise in the Miocene of La Grive Saint-Alban (Isere).

The available material of this form are maxillary fragments with teeth permitting comparison with the Cuyama specimen. Evidently there is resemblance between the Californian and European forms in size, although the former is slightly larger. P^2 is with simple type of crown in both, and the relation in size of that tooth to P^1 is likewise comparable in the two genera.

Of particular interest is the upper carnassial in *A. gaillardi*. As figured by both Wegner and Viret, the length of P^1 is only a trifle more than the length of the outer side of M^1 . P^1 is shown in Wegner's figures as lacking an anterointernal cusp (protocone) and in its place is a well developed cingulum which swings around from the front face of the tooth and extends along the inner side to the posterior end. In the text Wegner describes the inner side of P^1 as follows: Auf der lingualen Seite geht der weit ausgezogene Basalwulst zu dem Ansatz eines niederen Innenhöckers (Deuterocon) über. In the figures given by Viret the same construction of P^1 is seen.

⁶See Camp, C. L. and V. L. Vanderhoof, Geol. Soc. Amer., Spec. Paper No. 27, p. 320, 1940.

⁷Viret, J., Trav. du Lab. d. Geol. Lyon Univ., fasc. 21, mem. 18, p. 9. pl. 2, figs. 1-4, 1933.

⁸Wegner, R N., Palacontographica, Bd. 60, pp. 226-227, pl. 12, fig. 25, 1913.

P₁ in *Actiocyon* appears to possess a greater thickness across paracone and metacone than in *Alopecocyon gaillardi*. Also, the inner platform with its crenulate inner edge has a somewhat different shape from that in the European genus. Similarity of cusp arrangement in the first upper molar is evident when the two genera are compared.

On the basis of some of the characters displayed particularly by P₁ and M₁ *Actiocyon* shows some resemblance to the Procyonidae. The genus may represent an aberrant type of dog that has secondarily acquired some procyonid characteristics. No. 2747 lacks however the well developed inner cusp seen in the upper carnassial of living and extinct procyonids. P₁ and the molars posterior to this tooth have not acquired the breadth seen in *Potos* or *Nasua*. In the reduced size of M₂ No. 2747 is more like *Bassariscus* than like *Procyon*.

Actiocyon differs markedly from the specimen referred to *Cynarctus crucidens* by McGrew⁹ in the peculiar features of carnassial already described, in the subtriangular shape M₁, and in the much more reduced size of M₂. *Aletocyon* of earlier Miocene age than *Actiocyon* differs likewise from the latter in the better developed inner cusps of P₁, broader M₁, and relatively larger M₂. No special resemblance is seen to the South American genera *Pachynasua* and *Brachynasua*. It has not been possible to compare the Cuyama type with other fossil forms from South America.

⁹McGrew, Paul O., Geol. Ser. of Field Mus. Nat. Hist., vol. 6, no. 22, p. 329, fig. 89, 1938.